



Turning science into action

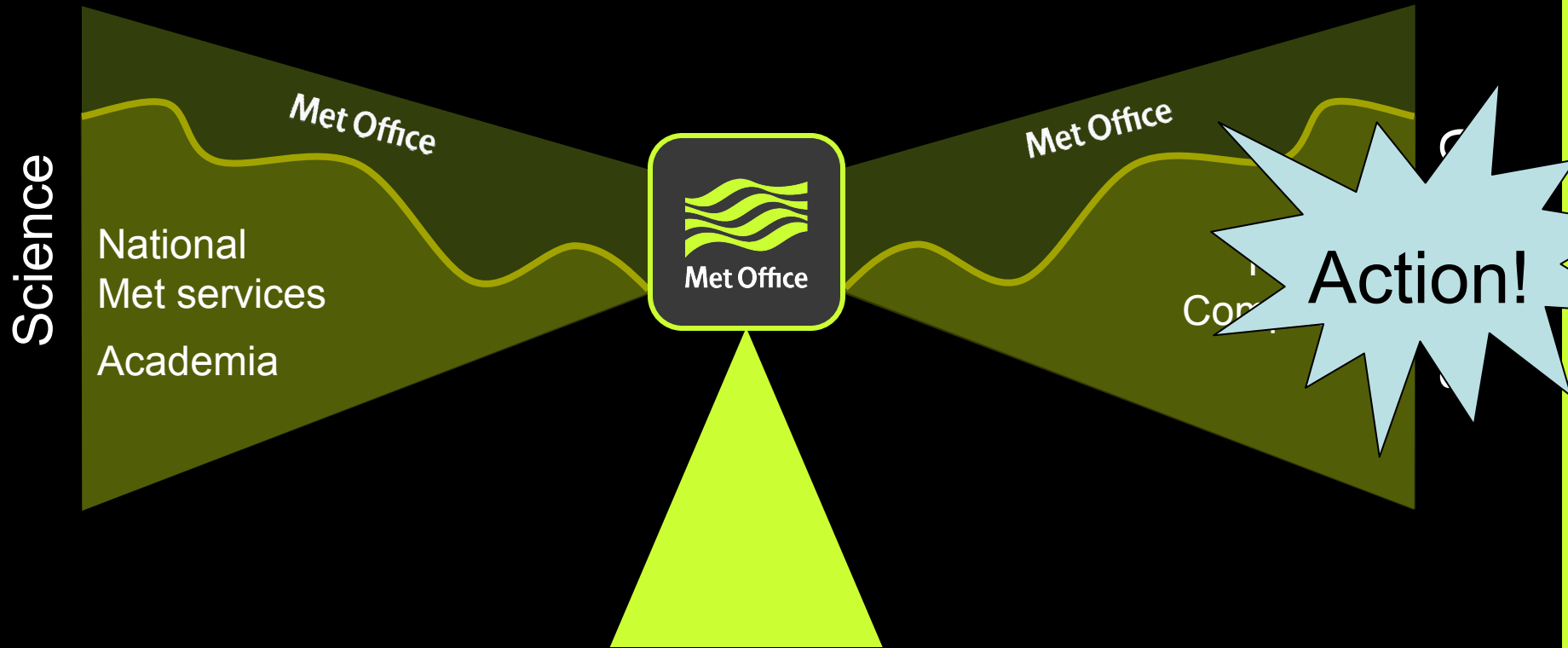
A satellite image of the Earth from space, showing the Western Hemisphere. The sun is rising over the horizon, creating a bright lens flare and illuminating the Western Hemisphere. The sun is positioned over the Atlantic Ocean, with its rays extending across the sky. The Earth's surface shows the continents of North and South America, with the sun rising over the Atlantic Ocean, creating a bright lens flare and illuminating the Western Hemisphere.

Rob Varley
Chief Executive, Met Office, UK



Met Office

The role of the NMS



Operationalising science and data for
governments, public and business



Turning science into action

My 33-year journey

- Advances in science
- Advances in observations
- Advances in HPC and NWP
- Decline of the forecaster
and the rise of automation
- Advice and impact-based weather
services
- Advice and impact-based climate
services

England: 2007 floods

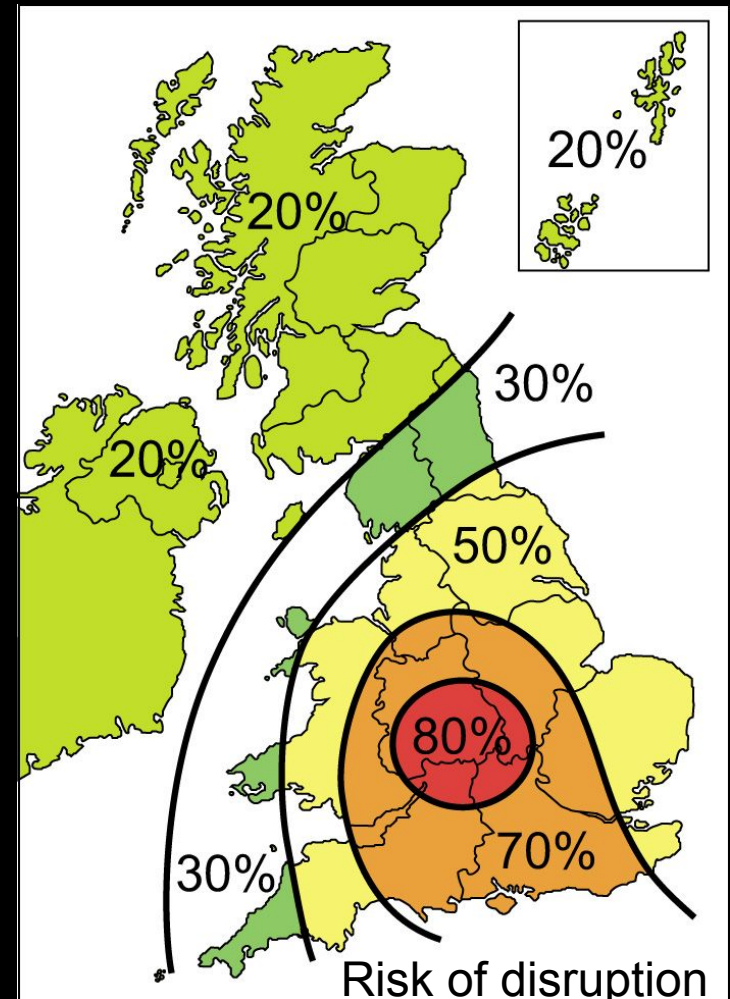




Severe weather warning: Heavy rain & floods 20 July 2007

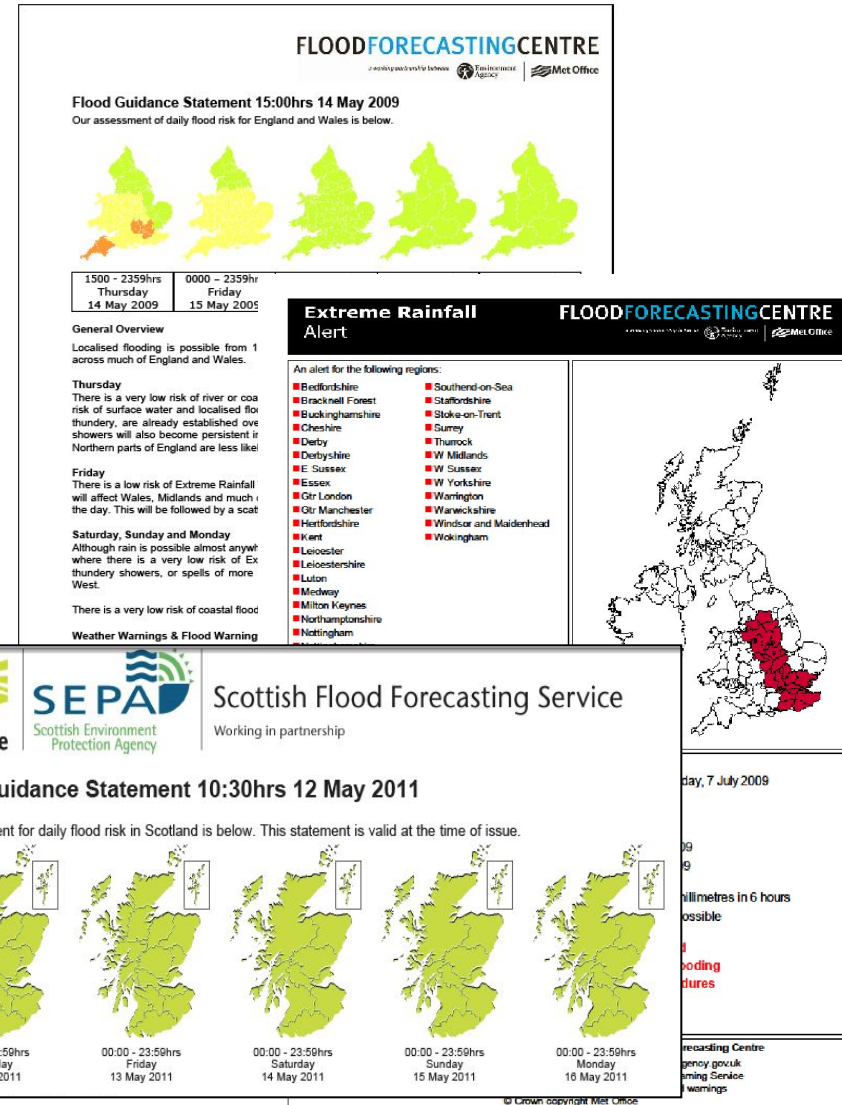
“Generally, the exceptional levels of rainfall in summer 2007 were well predicted, with the weather forecasts preceding the major July flooding in particular being the most detailed and accurate provided for any major flooding event in the UK.”

– Sir Michael Pitt, December 2007





“The Environment Agency and the Met Office should work together, through a joint centre, to improve their technical capability to forecast, model and warn against all sources of flooding.”

Pitt Report 2008



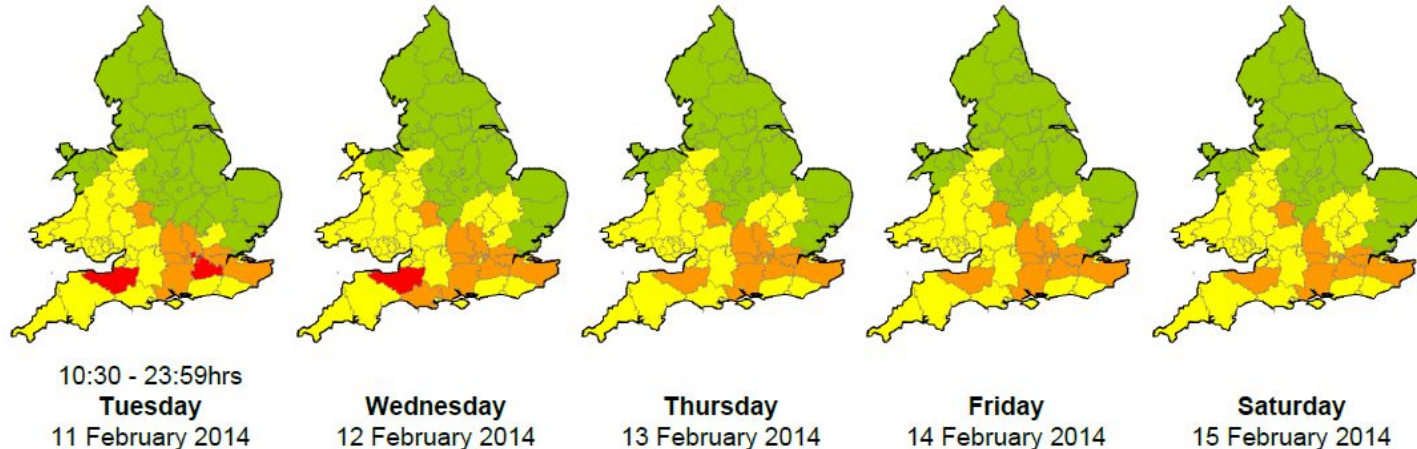
Winter 2013-14 – the wettest!

FLOODFORECASTINGCENTRE

a working partnership between  Environment Agency |  Met Office

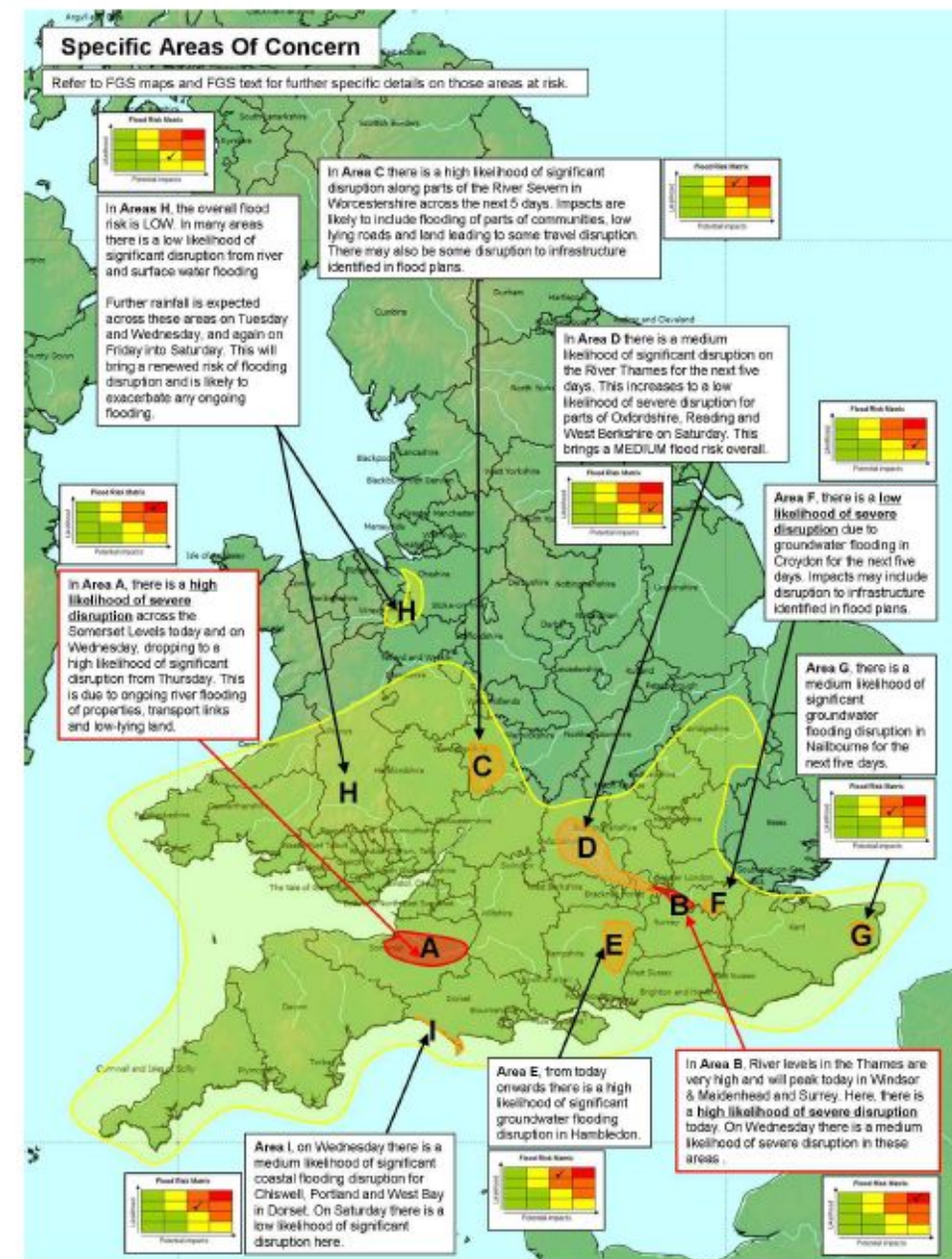
Flood Guidance Statement 10:30hrs Tuesday 11 February 2014

Our assessment of daily flood risk for England and Wales, working with flood forecasting teams in the Environment Agency and Natural Resources Wales, is below.



HIGH flood risk for the Somerset Levels today and on Wednesday. HIGH flood risk for Windsor & Maidenhead and Surrey today.

Specific areas of concern



Next statement due: 15:00hrs Tuesday 11 February 2014

Flood Guidance
Statement detail
10:30 UTC
11 Feb 2014



T



The **Met Office** has issued nine warnings for ice after disruption to road, rail and air travel following up to 16cm (6in) of snow in some areas.

Half of the 1,300 scheduled flights at Heathrow were cancelled and some trains and Tube services also disrupted.

been cancelled.

Local BBC news and information

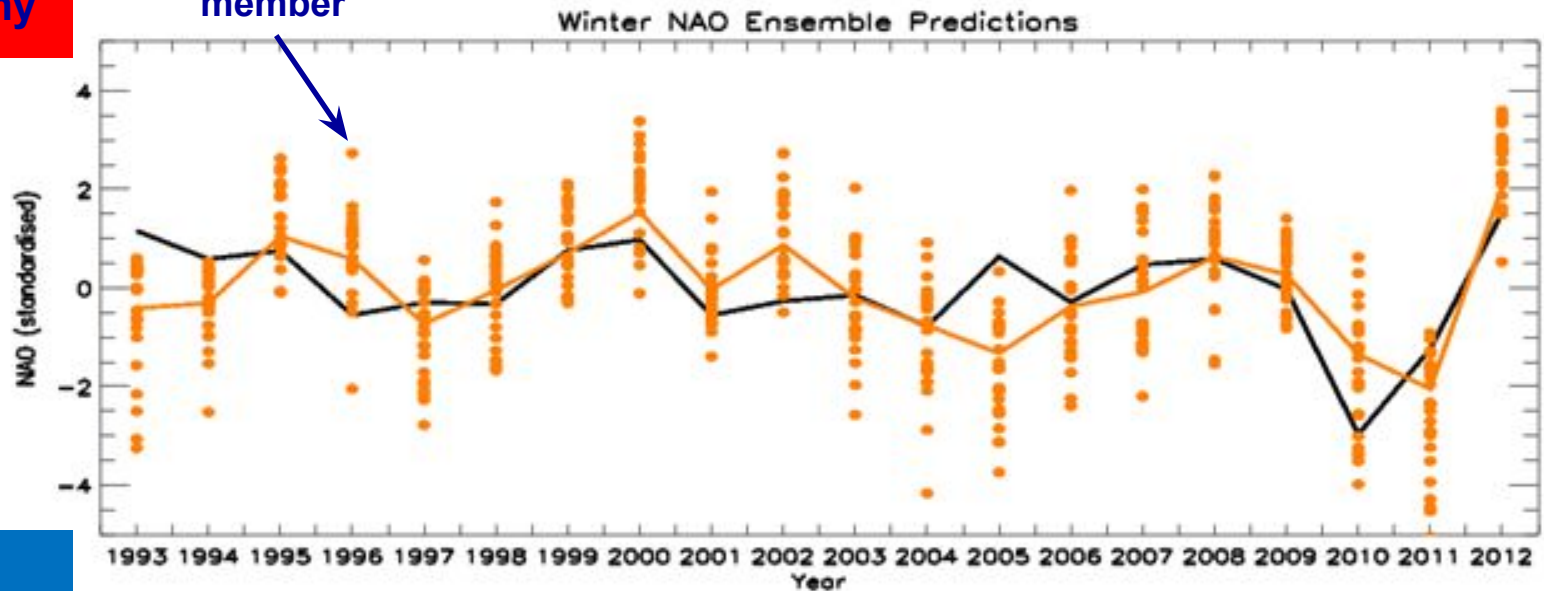
In pictures: Snowy Sunday

Seasonal prediction system

Demonstrated improved skill in UK winter prediction

+NAO
Mild, wet
and stormy

Ensemble
member



-NAO
Cold, snowy
and calm

Retrospective winter forecasts from early November *Scaife et al., 2014, GRL*

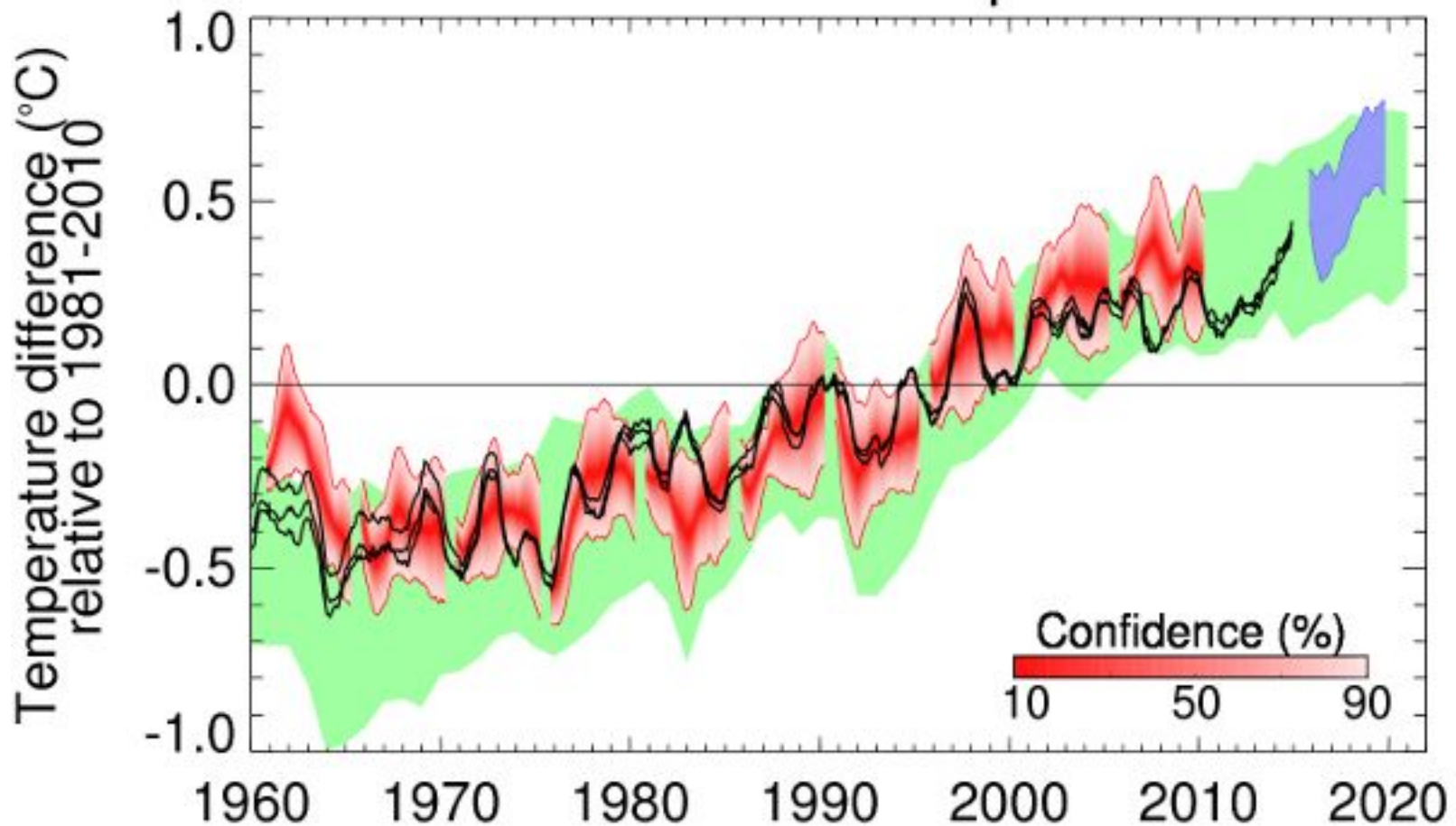


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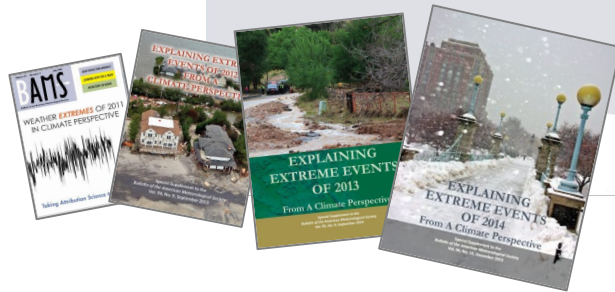
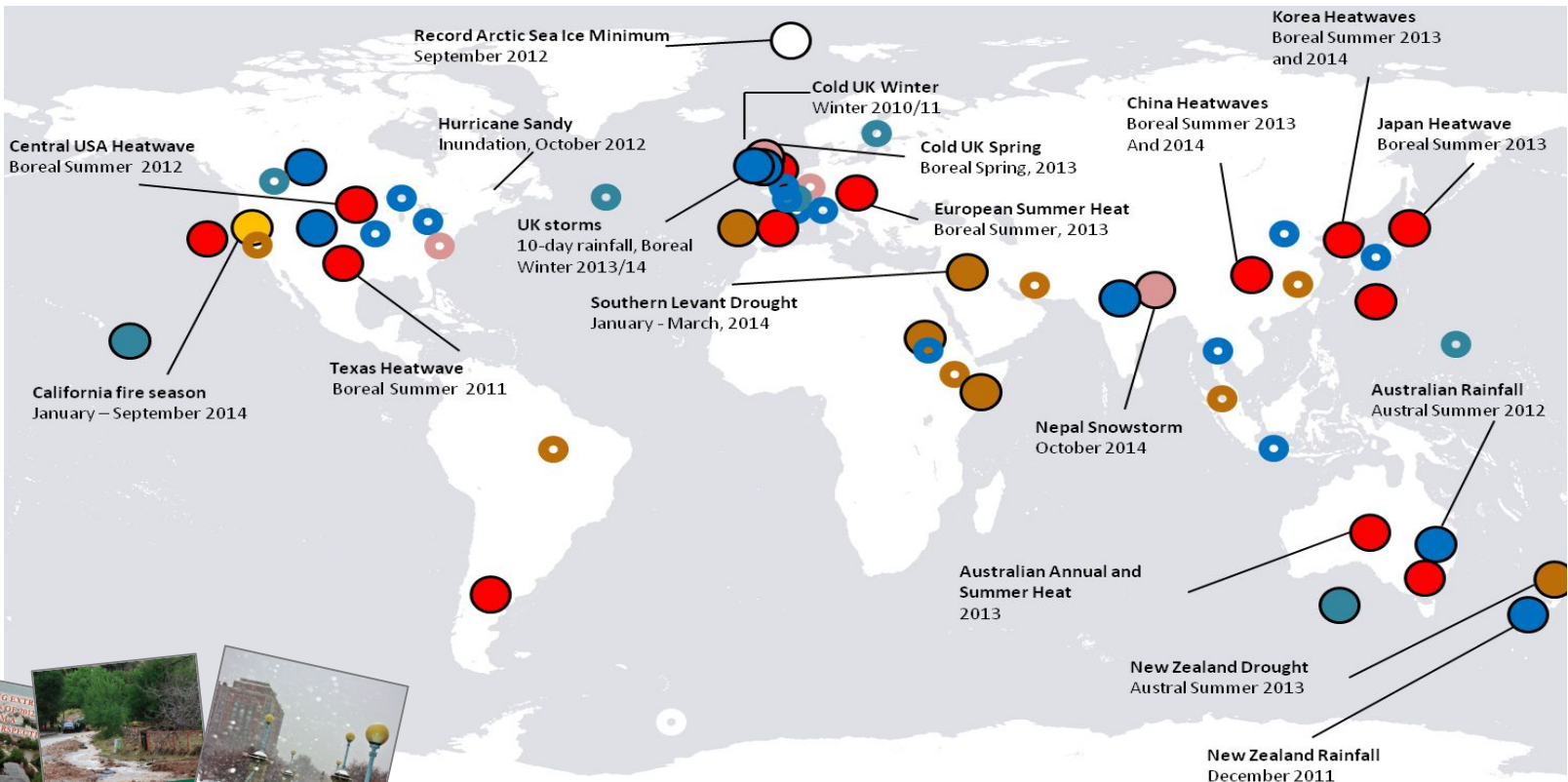
Met Office decadal forecast

Issued in January 2016

Global annual temperature



Attribution of Extreme Events



Detected human influence on likelihood or intensity of event

- Heat
- Precipitation
- Fire
- Drought
- Cold/Snow
- Sea ice
- Storms/Tropical cyclones

Small coloured circles indicate that an event attribution study has taken place, but that human influence on the likelihood of that event occurring was not found.

Extreme Weather and Climate Events 2011 - 2014

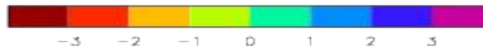
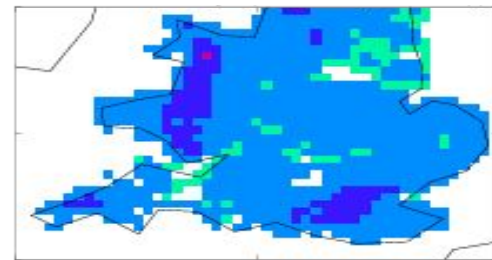
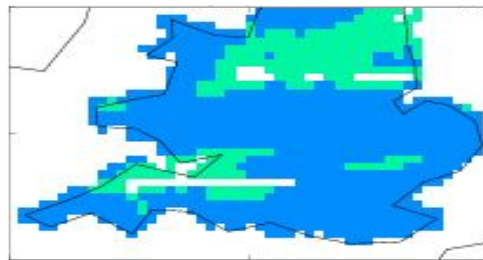
From climate projections to weather projections (UK)

Future change in heavy hourly rainfall
(upper 5%)

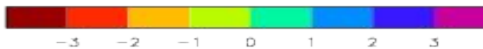
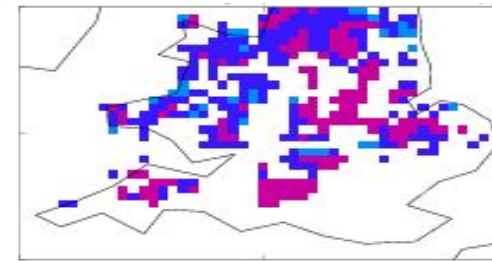
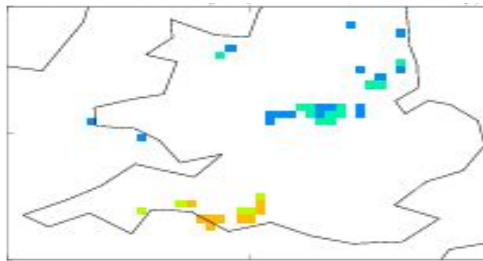
12km

1.5km

DJF



JJA





Climate Services

A revolution in the application of climate science

- From mitigation to **mitigation** and **adaptation**
- Climate change to **climate change and climate variability**
- Global, century-scale scenarios to **regional predictions, days to decades ahead**
- Global climate to **characteristics of hazardous weather and climate extremes**
- From **few** to **many** customers – public, governments, business and industry
- **Operational delivery** – from IPCC Assessment Reports to regularly updated monitoring, forecasts, products and services



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1 YEAR

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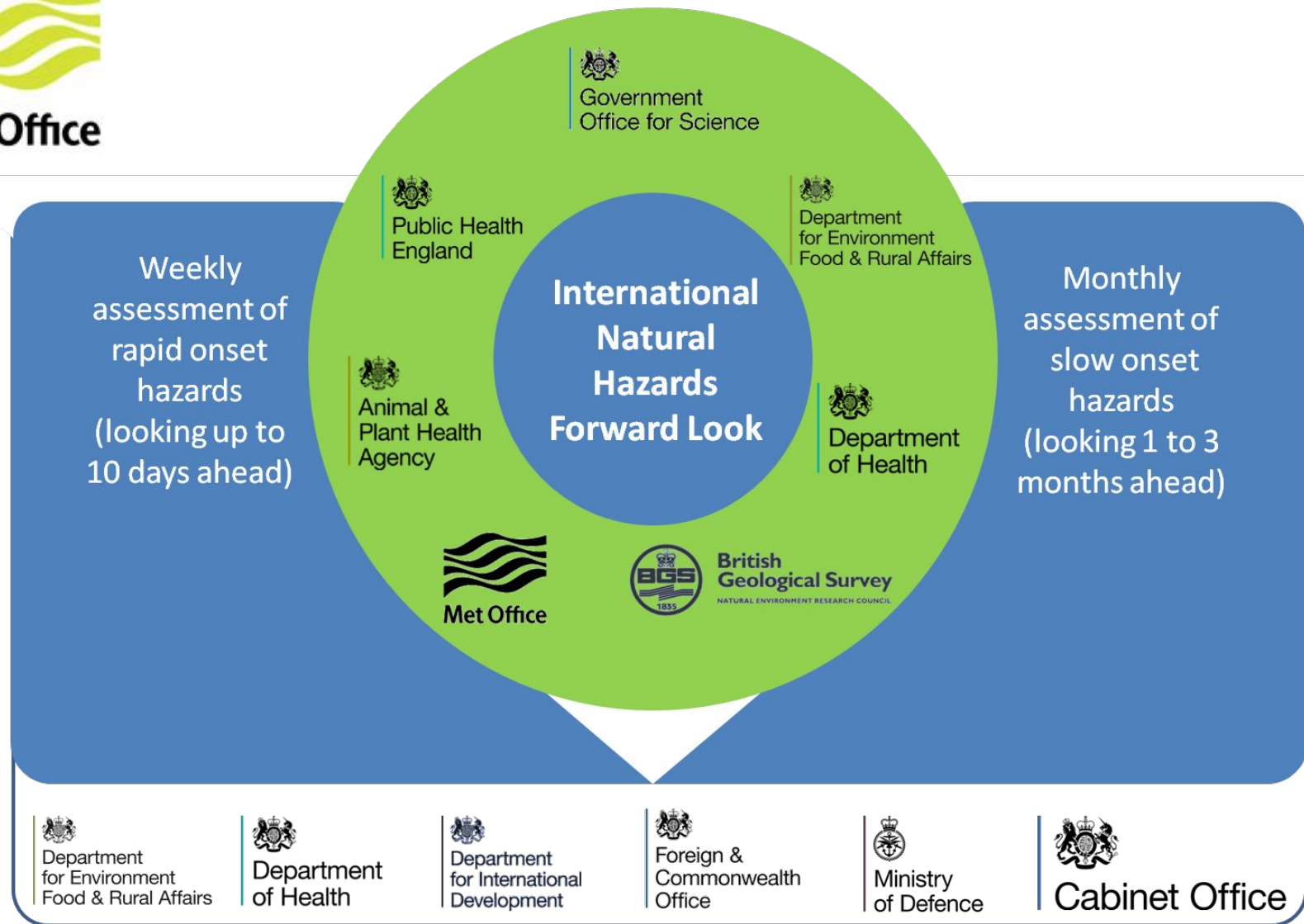


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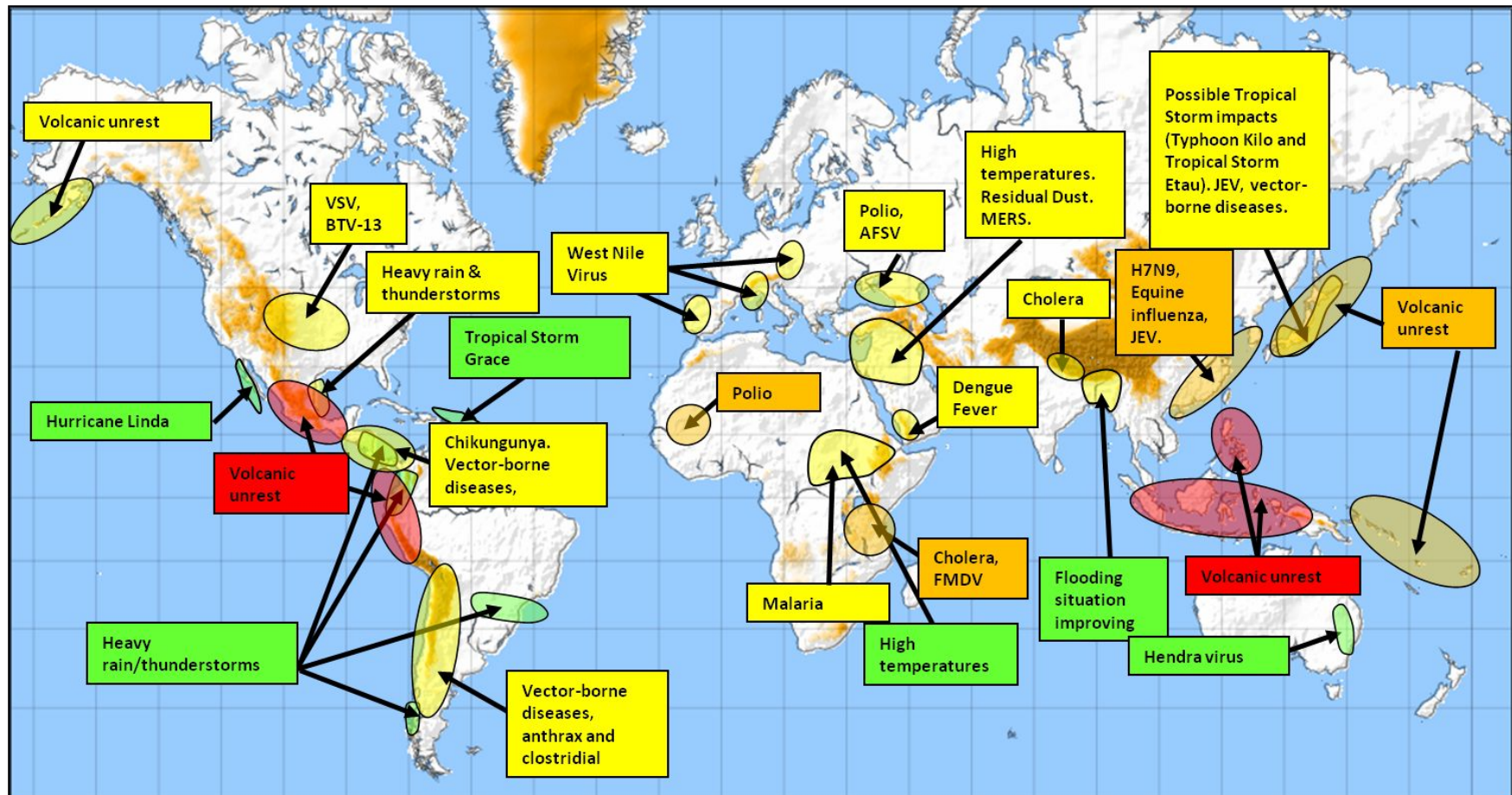


8 MONTHS









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International Natural Hazards Forward Look



International Natural Hazards Forward Look

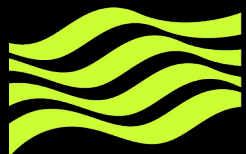

HM Government

Animal & Plant Health Agency

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Department for Environment Food & Rural Affairs

Government Office for Science

Met Office

Department of Health

Public Health England

COUNTRY	ASIA - HAZARD ASSESSMENT			IMPLICATION	UK IMPACT
	Hazard	Confidence	RAG (L/I)		
India	1. Meteorological: A monsoon depression is expected to affect eastern and central India from Wednesday through to Saturday, weakening through the weekend. This is likely to bring heavy rain with 150-200mm rain possible each day, with a risk of flooding.	Medium	ML	India: floods caused by protracted heavy rains have affected an estimated 10 million people across the country. Flooding is likely to become more widespread leading to displaced populations, ruined crops and disruption to infrastructure and services. International relief may be required. An enhanced flood risk extends into the interior of India where the monsoon depression tracks westward. Otherwise, significant flooding that has affected the region and recovery is likely to be locally exacerbated by any further heavy rainfall associated with showers/thunderstorms in the coming days.	NONE
	➤ 1a. Human health: increases in vector borne disease and leptospirosis may follow flooding associated with seasonal monsoon rains.	High	MM		
	➤ 1b. Animal health: Japanese encephalitis is a possibility; movement of animals from flood areas could bring increased contact and increased cases of various diseases (Foot-and-Mouth Disease for example)	High	LM		
India	2. Meteorological: The monsoon depression affecting central India from Wednesday (see India section) may reach as far NW as eastern Gujarat and eastern Rajasthan from Thursday as it weakens with up to 100mm rain possible locally each day. This follows heavy rains last week from a previous monsoon depression.	Medium	LL		NONE



Turning climate science into action

- **Saving** lives and livelihoods and **protecting** critical infrastructure.
- Contribute to a **more resilient nation**, better prepared for weather and climate risk.
- Helping government and business make **wise choices** for future investment in adaptation.
- Underpinning **mitigation** policies to avoid dangerous climate change.
- Supporting **economic growth** through better use of weather and climate information



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